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Abstract

LATINA NUCLEAR POWER STATION: COMMISSIONING AND FIRST OPERATIONAL EXPERIENCE

A. Bertini, G. Gualtieri, G. Lesnoni and B. Zaffiro
ENEL, IMPRESA SIMEA Latina, Italia
M. Calcagno and R. Negrini
SNAM, Divisione Agip Nucleare, Milano, Italia

The paper describes the main tests carried out during reactor commissioning and the subsequent operational measurements and analyses relevant to the safety and efficiency of the Latina reactor.

The commissioning tests described are:

1. First loading to criticality and small pile experiments.
2. Loading to full size and built-in reactivity measurement.
3. Absorber calibrations and associated experiments.
4. Cold control rod calibrations and shut-down capacity evaluations.
5. Gas setting.
6. Hot built-in reactivity measurements and temperature effect on control rod efficiency.

Wherever possible, the experimental results were compared with the available theoretical predictions made by the design divisions.

A peculiar aspect in that the Latina power station has ever been specifically designed to give flexible performance over the power range.

The paper includes a brief description of how the overall power control system has been arranged to achieve this, and gives operational results.

The unusual occurrences of the first operating period are then described, among which procedure which was followed for recovering a control rod that dropped into the core due to the failure of the holding chain.

During this same period, a number of experiments were performed and some procedures or new techniques were developed in order to link commissioning and routine operation and complete the results obtained during the test period.

The main feature of these procedures is that they affect directly the efficiency and safety of the plant operation.

They can be summarized as follows:

(a) Absorber cycling, with contemporary local reactivity compensation by locally trimming control rod pattern. This eliminates or reduces to a large extent local temperature peaks, allowing better average gas outlet temperatures during absorber movements.

(b) Identification of the burst fuel element among the eight of a suspect channel, on removal from the channel. This makes possible a saving in fuel and time in bottling and transport expenses as well as in laboratory examinations.

(c) Operational calibration of the control rods by the xenon technique.

(d) Assessment of the standard deviation of the readings of the reactor thermocouples by means of experiments on isothermal reactor.

(e) Experiments relative to the flux disturbances subsequent to irregular movements of individual control rods, either scheduled or accidental, and determination of safe procedures.

(f) Preparation and finalization of new measurement methods with operational purposes, such as temperature coefficients.

A general assessment of the commissioning and initial operation at power is made in the conclusion.